

WHAT IS CLAIMED IS:

1. A method for monitoring assets using radio frequency tags, comprising:

5 storing in each of a plurality of primary tags an identification of each linked tag associated with the primary tag;

in response to a polling event for one of the primary tags, the primary tag transmitting a query message for linked tags within an operational range of the primary tag;

10 each linked tag receiving the query message transmitting a response message including an identification of the linked tag; and

15 the primary tag receiving the response messages and comparing the identifications in the response messages to the identifications stored for each linked tag associated with the primary tag.

20 2. The method of Claim 1, further comprising the primary tag determining a monitored asset status based on the comparison of the identifications in the response messages to the identifications stored for each linked tag associated with the primary tag.

25 3. The method of Claim 2, further comprising the primary tag generating an alarm condition in response to the monitored asset status indicating that a linked tag is missing from the operational range of the primary tag.

30 4. The method of Claim 2, further comprising the primary tag generating an alarm condition in response to the monitored asset status indicating that no linked tags are present in the operational range of the primary tag.

5. The method of Claim 2, further comprising:

a non linked tag receiving the query message transmitting a response including an identification of the non linked tag; and

5 the primary tag generating an alarm condition in response to the monitored asset status indicating the presence of the non linked tag in the operational range of the primary tag.

10 6. The method of Claim 1, wherein the polling event is initiated by a base station.

15 7. The method of Claim 1, wherein the polling event is periodically generated by the primary tag based on the passage of a specified period of time.

20 8. The method of Claim 1, further comprising the primary tag reporting the results of the comparison to a base station.

9. A method for monitoring assets using radio frequency tags, comprising:

storing in a primary tag an identification of a linked tag associated with the primary tag;

5 in response to a polling event for the primary tag, transmitting a query message to tags within an operational range of the primary tag;

receiving response messages from tags within the operational range of the primary tag, the response messages each including an identification of the tag generating the response message; and

10 comparing the identification in each response message to the identifications of the linked tags stored in the primary tag.

15 10. The method of Claim 9, further comprising the primary tag determining a monitored asset status based on the comparison of the identifications in the response messages to the identifications of the linked tags stored in the primary tag.

25 11. The method of Claim 10, further comprising the primary tag generating an alarm condition in response to the monitored asset status indicating that a linked tag is missing from the operational range of the primary tag.

30 12. The method of Claim 10, further comprising the primary tag generating an alarm condition in response to the monitored asset status indicating that no linked tags are present in the operational range of the primary tag.

5

10

15

16. The method of Claim 9, further comprising the primary tag reporting the results of the comparison to a base station.

5

10

15

20

25

30

21. The primary radio frequency tag of Claim 17, the receiver comprising a first receiver operable to receive the response messages on a first frequency;

the primary tag further comprising:

5 a second receiver operable to receive a status request from a base station on a second disparate frequency; and

 a polling engine operable to generate the polling request in response to the status request.

10

065446.0114

22. An asset monitoring system comprising:

at least one secondary tag comprising:

an identification;

a receiver operable to receive a polling request;

5 a transmitter operable to transmit a response message in response to the polling request, the response message including the identification of the secondary tag;

a primary tag comprising:

10 a storage unit for storing the identification of at least one secondary tag associated with the primary tag;

a transmitter operable to transmit the polling request within the operational range of the primary tag;

15 a receiver operable to receive response messages from secondary tags within the operational range of the primary tag; and

a controller operable to compare the identification in each response message to identifications stored in the storage unit and to determine a monitored asset status based on the comparisons.

20 23. The asset monitoring system of Claim 22, wherein the primary radio tag is an active tag.

25 24. The asset monitoring system of Claim 22, wherein the one or more secondary radio tags are passive tags.

5

a receiver operable to receive the monitored asset status from the primary tag responsive to the status request.

26. The asset monitoring system of Claim 25, wherein the base station transmits at a first frequency and receives at a second disparate frequency.

27. The asset monitoring system of Claim 25, the receiver of the primary tag comprising a first receiver operable to receive the response messages on a first frequency, the primary tag further comprising a second receiver operable to receive the status request from the base station on a second disparate frequency.

28. An asset monitoring system, comprising:
a plurality of secondary tags, each comprising:
an identification;

5 a receiver operable to receive an intermediate
polling request;

a transmitter operable to transmit a response
message to the intermediate polling request, the
response message including the identification of the
secondary tag;

10 a plurality of intermediate primary tags, each
comprising:

a storage unit storing the identification of a
plurality of secondary tags associated with the
intermediate primary tag;

15 a transmitter operable in response to a polling
request from a primary tag to transmit the intermediate
polling request within the operational range of the
intermediate primary tag and to transmit an intermediate
monitored asset status to the primary tag;

20 a receiver operable to receive response messages
from secondary tags within the operational range of the
intermediate primary tag in response to the polling request
from the intermediate primary tag;

25 a controller operable to compare the
identification in each response message to identifications
stored in the storage unit and to determine the
intermediate monitored asset status based on the
comparisons;

a primary tag comprising:

30 a transmitter operable to transmit the polling
request within the operational range of the primary tag;

a receiver operable to receive intermediate
monitored asset statuses from the intermediate primary
tags; and

a controller operable to determine a monitored asset status based on the intermediate monitored asset statuses.

5 29. The asset monitoring system of Claim 28, wherein the primary and intermediate primary tags are active tags and the secondary tags are passive tags.

10 30. The asset monitoring system of Claim 28, further comprising a base station, the base station comprising:

a transmitter operable to transmit a status request to the primary tag; and

15 a receiver operable to receive the monitored asset status from the primary tag responsive to the status request.

20 31. The asset monitoring system of Claim 28, wherein the primary tags are mounted to a transport vehicle, the intermediate primary tags are mounted to shipping containers, and the secondary tags are mounted to items shipped in the shipping containers.

32. A secured environment, comprising:

an access door;

a first object having a secondary radio frequency tag,
the secondary radio frequency tag comprising:

5 an identification;

a receiver operable to receive a polling request;

a transmitter operable to transmit a response
message responsive to the polling request, the response
message including the identification of the secondary tag;

10 a second object having a primary radio frequency tag,
the primary radio frequency tag comprising:

a storage unit for storing the identification of
one or more secondary radio frequency tags for objects
authorized to transport the second object through an access
15 door;

a transmitter operable in response to an
authorization request from a door control unit to transmit
the polling request within the operational range of the
primary radio frequency tag and to transmit an
20 authorization response to the door control unit for the
access door;

a receiver operable to receive response messages
from secondary radio frequency tags within the operational
range of the primary radio frequency tag and to receive the
25 authorization request from the door control unit;

a controller operable to compare the
identifications in each response message to identifications
stored in the storage unit and to determine the
authorization response based on the comparison;

30 the door control unit, comprising:

a transmitter operable to transmit the
authorization request;

a receiver operable to receive the authorization
response from the primary radio frequency tag; and

a door controller operable to control the access door based on the authorization response from the primary radio frequency tag.

- 5 33. The secured environment of Claim 32, wherein the primary tag is an active tag and the secondary tag is a passive tag.

34. A method for monitoring mobile assets,
comprising:

in response to a polling event, a primary tag
transmitting a query message for secondary tags within an
operational range of the primary tag;

each secondary tag receiving the query message
transmitting a response message indicative of the secondary
tag's proximity to the primary tag; and

the primary tag receiving the response messages and
taking predefined action.

35. The method of Claim 34, wherein the predefined
action includes the primary tag generating an alarm if
secondary tags are present within the operational range of
the primary tag.

36. The method of Claim 34, wherein the predefined
action includes the primary tag generating an alarm if
secondary tags are not present within the operational range
of the primary tag.

37. The method of Claim 34, wherein the polling event
occurs on a periodic basis after a passing of a specified
period of time.

38. The method of Claim 34, wherein the polling event
includes the primary tag receiving a polling request from
a base station or other primary tag.